›PROCEEDINGS

OF THE

ROYAL SOCIETY OF EDINBURGH.

VOL. II. 1844–5. No. 26.

SIXTY-SECOND SESSION.

Monday, 17th February 1845.

RIGHT REVEREND BISHOP TERROT in the Chair.

The following Communications were read:—

1. On the Existence of peculiar Crystals in the Cavities of the Topaz. Part I. By Sir D. Brewster.

2. On the Use of Colourless Ink in Writing. By Sir George Mackenzie.

Many years ago, the author had attempted to separate the component parts of common ink, with the view to get rid of its inconvenience in soiling everything with which it came in contact, by committing some of the parts to paper, and some to the pen. Working with solutions, he found that, in all his trials, the paper was, sooner or later, discoloured more or less, so as to unfit it for the market, and he abandoned the attempt. He afterwards tried salts of iodine, but failed to fix the colour which they yielded. After another interval, the subject again recurring, he was led, by an accidental circumstance, to think he might attain the long sought-for object by using dry powders for the paper, instead of solutions. The first trial satisfied him that he was, at length, to succeed; and, after persevering a considerable time, he brought certain processes so far as to yield good paper. With an almost colourless ink, prepared with permuriate of iron, traces were instantaneously produced, dark enough for ordinary purposes. The powder introduced

into the machine for preparing the paper, is compounded of galls, anhydrous ferro-prussiate of potassium, and carbonate of lime, so diluted with rice flour, that enough, and no more of the powder than enough, remains among the fibres of the paper. The paper is sized before being passed through the machine, and is afterwards finished in the usual manner. Specimens of different qualities of paper were laid on the table, and written on with the colourless ink by the members present.

3. On the Use of Metallic Reflectors for Sextants, and on the Determination of the Errors arising from Non-Parallelism in the Mirrors and Sun-Shades of Reflecting Instruments. By John Adie, Esq.

The object of this communication was to shew that, by the use of metallic reflectors for sextants, greater accuracy was obtained in the observed angles, and also that larger angles could be observed. Objects were seen reflected by metallic mirrors, which could not be seen when glass was used; and that when the alloy was formed of pure metals, it was not subject to rust or tarnish, even when exposed to action of the sea air.

The author then exhibited a sextant fitted with these mirrors, which had been employed for a season in the survey of the north coast of Scotland, under Mr Mossman, and read extracts of letters from that gentleman.

In the second part, he describes methods by which the non-parallelism in mirrors and shades may be determined with great accuracy, before they are applied to reflecting instruments.

A Ballot then took place for the following Candidates, recommended by the Council at last Meeting for filling places in the Foreign Honorary list:—

MM.	Cauchy,	Paris,
	Charpentier,	Bex,
	Ehrenberg,	Berlin,
	Elie de Beaumont,	Paris,
	Guizot,	Paris,
	Hansteen,	Christiania,
	Jacobi,	Königsberg,
	Lamont,	Munich,

Liebig, ... Giessen,
Melloni, ... Naples,
Neander, ... Berlin,

all of whom were declared to have been duly elected Foreign Honorary Members of the Society.

The following Donations were presented:—

List of Specimens of Birds in the Collection of the British Museum. Parts 1. and 3. Accipitres, Gallinæ, Grallæ, and Anseres.

List of the Specimens of Lepidopterous Insects in the Collection of the British Museum. Part 1.

List of the Specimens of Myriapoda in the Collection of the British Museum.

Catalogue of the Tortoises, Crocodiles, and Amphibænians, in the Collection of the British Museum.—*By the Trustees of the British Museum.*

The Electrical Magazine, conducted by Mr Charles W. Walker. Vol. I. No. 7.—*By the Editor.*

Tijdschrift voor Naturlijke Geschiedenis en Physiologie—Uitgegeven door I. van der Hoeven, M.D. en W. H. De Vriese, M.D. Deel XI. Stuks 3, 4.—*By the Editors.*

Cast of the Bust of the late Professor Playfair, which was executed by the late Sir Francis Chantrey.—*By Sir George Mackenzie, Bart.*

Fifteenth Report of the Scarborough Philosophical Society.—*By the Society.*

Monday, 3*d March* 1845.

Sir T. M. BRISBANE, Bart., President, in the Chair.

The following Communications were read:—

1. On the Existence of peculiar Crystals in the Cavities of Topaz. Part II. By Sir D. Brewster, K.H.

The author, after alluding to his former papers on the fluids in topaz, described, in Section I., the form and position of the strata in the minerals in which the cavities occur. They generally occur in immense numbers, occupying extensive strata, and injuring the transparency of the mineral. These strata occupy every possible

position, and have every possible curvature; their shape is equally irregular; and it is probable that, in every case, some edge or angle of the stratum touches the surface. The cavities are sometimes concentrically arranged, and sometimes occur in parallel straight lines. In one specimen, they radiate from a centre. When different strata occur in the same specimen, they generally differ in the character of the cavities, one stratum containing flat, another deep cavities, &c. The whole facts lead to the conclusion, that the strata of cavities have been formed under the influence of forces propagated through a plastic mass, carrying with them gases and vapours, which came to a position of rest previous to the crystallization of the mineral. In Section II. the author describes some new observations on the two fluids formerly discovered by him. In some cases of flat cavities, the faces of which are parallel to the planes of easy cleavage, the application of heat forced the fluid between the laminæ of the crystal to a distant part. In one specimen, a white ball was seen to be projected from one cavity to the edge of the specimen, as in a case formerly described. In other specimens, where the dense fluid was accompanied by a bubble of some gas, the application of heat increased the size of the bubble, which then threw off a smaller to a distant spot. On cooling, the latter disappeared, and the former recovered its original size. Apparently the gas was here absorbed by the liquid on cooling. While the bubble expanded by heat, the liquid was forced into minute tubes or slits, from which, on cooling, it returned. In Section III. he described the form and position of the crystals in the cavities of topaz. They are both fixed and moveable, and often beautifully formed. They are very numerous, and occur in several different forms, which are enumerated, a very frequent one being the cube. In Section IV. he treated of the physical properties of these crystals. Many of them melt or dissolve in the fluid in a gentle heat, others with difficulty, some not at all. Those which melt are commonly reproduced, on cooling, of their original form, with modifications. The tessular crystals have no action on polarized light; but there seem to be two substances in this form, as some tessular crystals melted, while others were found infusible in any heat used. The doubly refracting crystals would appear to be of three kinds, as some melted easily, others with difficulty, others not at all. They did not depolarize white light, or the highest order of colours. One crystal melted, and was reproduced, without any fluid being present. In another cavity, several crystals, when heated, darted across the cavity, while others rotated

rapidly round their middle point. Too strong a heat often bursts the cavities, separating the laminæ of the topaz. The volatile fluid, escaping, leaves a crystalline residue; the dense fluid disappears entirely, and is probably a condensed gas. In one specimen, the faces of the cavities formerly filled with the volatile fluid, are corroded, as if by a solvent, developing crystalline structure; an appearance analogous to that which has been observed on the external surface of topazes. In Section V. the author described crystals embedded in the mass of the topaz, some of which can only be detected by polárized light, as they do not affect the transparency of the crystal by common light. He concluded by describing cavities lined with a doubly refracting crust or shell, with optical and crystallographic axes—a phenomenon which has no parallel in mineralogy. These cavities have the *appearance* of embedded crystals, but are detected by depolarizing a uniform tint with a variable thickness of crystal.

2. On the Extraction of pure Phosphoric Acid from Bones, and on a New and Anomalous Phosphate of Magnesia. By Dr Gregory.

The author, after explaining the methods hitherto proposed for purifying the phosphoric acid of bone earth, and pointing out their inconveniences, mentioned that the chief difficulty was the separation of the magnesia always present in bone earth. The lime, it has been for some time known, may be entirely removed by means of sulphuric acid. In repeating the process of Liebig, which did not succeed in his hands, and which requires the use of alcohol, he found that, after the separation of the lime, there is obtained, by evaporation and heating, a clear and colourless glass, containing all the magnesia: that this glass dissolved completely by boiling in water; but that the solution, if again evaporated and heated to 600° for a quarter of an hour in a platinum capsule, became turbid, and deposited the whole magnesia as an insoluble salt. When water was added, so as to dissolve the phosphoric acid, and the insoluble salt separated by the filter, the filtered liquid was found absolutely free from magnesia, and was a solution of pure phosphoric acid.

The insoluble salt of magnesia above mentioned is new. It is remarkable for its insolubility in water and acids; and its composition, as ascertained by several concurring analyses, is—

Magnesia, ...	16.54
Phosphoric acid,.........	83.46
	100.00

It contained no water, and must therefore be composed according to the formula, $2\,Mg0 + 3\,P_2 0_5$. This formula, the author shewed, could not be reconciled with the prevalent views of the constitution of phosphates, and the existence of this salt might therefore lead to some modification of these views.

The following Donations were presented :—

The Journal of the Royal Agricultural Society of England. Vol V. Part 2.—*By the Society.*

Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce. Vol. LV.—*By the Society.*

Memoirs and Proceedings of the Chemical Society. Part 11.—*By the Society.*

The Journal of Agriculture, and the Transactions of the Highland and Agricultural Society of Scotland, for March 1845.—*By the Society.*

Fifteenth Report of the Scarborough Philosophical Society, for the year 1844.—*By the Society.*

Monday, 17*th March* 1845.

SIR GEORGE S. MACKENZIE Bart. in the Chair.

The following Commmunications were read :—

1. On the Improvement of Navigation in Tidal Rivers. By David Stevenson, Esq.

Three compartments are pointed out as existing in all rivers, when viewed in connection with the sea, possessing different characteristics, and requiring different classes of works for their improvement. These are, *first*, The " sea proper," characterised by the presence of unimpaired tidal phenomena, and including all works connected with the improvement of bars. *Second*, The " tidal compartment of the river," characterised by the modified flow of the tide, produced by the inclination of the bed, and embracing works connected with the straightening, widening, or deepening, of the beds of rivers ; the

formation of new cuts; the erection of walls for the guidance of tidal currents, and the shutting up of subsidiary channels. And the *third* compartment is the "river proper," which is characterised by the absence of all tidal influence, the improvement of which is generally effected by means of dams erected in the bed of the river, and forming stretches of canal communicating with each other by means of locks in the dams. The practical remarks are confined to the improvement of the tidal compartment only, which possesses sufficient importance to entitle it to form the subject of a distinct communication; the prosperity of the ports of London, Bristol, Newcastle, Glasgow, and many other places, being intimately connected with it.

The author shews, that, owing to the smallness of the rivers of this comparatively narrow country, they can be advantageously navigated only while their waters are deepened by the influx of the tide, and proposes, as the surest means of effecting improvement, such works as produce an *increase in the duration of tidal influence.*

Instances of the success of these works are given. The rise is the bed of the Tay from Newburgh to Perth (8·56 miles), in consequence of works that have been executed, has been *reduced* from *four* to *two* feet. The time occupied in the passage of the tidal wave between these places has been *decreased fifty minutes*, and the speed with which it travels *increased* $1\frac{3}{8}$ *of a mile per hour.* The duration of flood-tide at Perth has been *increased fifty minutes*, and the time during which the river at that place is uninfluenced by the tide, has been *decreased forty-five minutes.* It is also calculated that an additional quantity of sea water, amounting, on an average, to 760,560 tons, is propelled into, and again withdrawn from, that part of the river extending above Newburgh every tide. At the Rubble in Lancashire, similar benefits have resulted from similar operations; the tidal range at Preston having been *increased* between *three and four feet*, and the propagation of the tidal wave *accelerated about forty minutes.*

The following are the practical inferences which the author draws from the facts brought forward:—

First, That owing to the comparatively contracted country from the drainage of which our rivers derive their supplies, it is chiefly from *increased duration of tidal influence* that we must expect improvement in tide navigation, the regulation of the fresh water stream being an operation of secondary importance, but not, on that account, to be overlooked.

Second, That the whole tidal phenomena of the navigation to be improved ought to be ascertained, in order that the engineer may be enabled to discover in what part of the river the most prejudicial retardations of the tidal wave, and obstructions of the current, take place.

Third, That, in tracing these retardations to the proper cause, and suggesting means for their removal, works should be adopted which do not injuriously abstract tidal water from the sea channels.

Fourth, That the works best suited for attaining the desired end consist chiefly in lowering the bed of the river, and removing all natural or artificial obstructions, and in erecting low rubble walls for the direction of the currents.

Fifth, That although *general* views of the nature of these operations may be given, the precise details of such works as shall be best suited to particular localities can, in the present state of our information, be determined only by Engineering experience. And,

Lastly, That, by the execution of works designed in accordance with these general views, very beneficial results have been, and may be, produced, for a comparatively small expenditure.

2. On the Solvent Action of Drainage Water on Soils. By John Wilson, Esq., F.G.S. Communicated by Dr Gregory.

The author, being resident for a time in East Lothian, in order to study the system of agriculture, it occurred to him that the very extensive and complete drainage must materially affect the soil by removing large quantities of its soluble ingredients.

He was disappointed, owing to an accident, in examining, quantitatively, the water which had been first collected for the purpose; but on examining, qualitatively, some that was collected after the drain had been running very copiously for 36 hours, he found it to contain 18.4 grains of soluble matter per gallon. This was chiefly the usual salts of lime and organic matter.

He examined the surface and subsoils of the field, and found them to contain, besides silica and alumina, iron, lime, and traces of magnesia, with organic matter. The iron in the surface soil was in the state of protoxide, but in the subsoil it was found peroxidised.

The author concludes that the drainage water carries off a very large quantity of the soluble matter of the soil, which he calculates as possibly amounting to 775 lbs. per acre in the year, a quantity

equivalent to a good dose of manure. He recommends the adoption of some means to prevent this great loss, and promises to continue his researches, and bring forward more precise results.

The following Donations were presented:—

Anatomical and Pathological Observations. By John Goodsir, F.R.S.E., and Harry D. S. Goodsir, M.W.S.—*By the Authors.*

The American Journal of Science and Arts, conducted by Professor Silliman, for January 1845.—*By the Editor.*

Monday, 7th April 1845.

Sir T. M. BRISBANE, Bart., President, in the Chair.

The following communications were read:—

1. Observations on the Temperature of the Earth at Trevandrum, in Lat. 8° 30′ 32″. By John Caldecott, Esq. Reduced, with some Remarks, by Professor Forbes.

The present notice is a sequel to one presented to the Royal Society on 1st May 1843, containing the results of Mr Caldecott's Observations on the Temperature of the Earth in India, made by means of thermometers sunk to depths of 3, 6, and 12 French feet, corresponding to those employed in the three stations near Edinburgh, of which the results are already before the Society.

The position of the instruments is mentioned in the former notice (*Proceedings*, vol. i. page 432).

A later note from Mr Caldecott, dated 10th August 1843, accompanies the detailed observations made upon the three thermometers four times a-day (every 6 hours) for the whole year, from July 1842 to July 1843, Sundays excepted.

The most remarkable circumstance connected with the observations, is the extraordinary excess uniformly observed of the earth temperature above the air temperature. The index error of the instruments is so large, as might have excited a suspicion of some inaccuracy in its determination, but for the known experience and skill of Mr Caldecott. I shall therefore quote what his letter says on this point. "The readings of the thermometers, as given in these tables [containing the observations *at large*], require a correction in order to reduce them to those of the standard thermometer. This correction, derived from a comparison of them with the standard,

made every two hours for rather more than a month, before they were put into the ground, is as follows :—

No. 1—12 feet long, requires the addition of ...... $2°.133$.
2—6 .... 2.172.
3—3 .... 2.922."

This detail is even too minute to render a considerable mistake at all likely; we must therefore take the results as we find them, which are contained in the following table, where the numbers are *all corrected*, and compared with the mean temperature of the air, and the quantity of rain. It will be observed, that several of the observations of the warmer months have been lost, owing to the large index error having misled the maker as to the range which would be required, and consequently the spirit rose above the scale.

Abstract of Observations of Terrestrial Temperature at Trevandrum.
Lat. 8° 30′ 32″ N. Long. $5^h\ 7^m\ 59^s$ E. of Greenwich.

	No. 1. 12 feet Thermometer.	No. 2. 6 feet Thermometer.	No. 3. 3 feet Thermometer.	Mean Temperature of Air.	Rain.
1842.					Inches.
May	86°.805	87°.349	86°.742	80°.09	14.513
June	...	86.742	84.977	79.32	8.747
July	86.938	85.789	83.901	78.73	5.951
August	86.383	84.940	83.147	77.90	4.424
September	85.930	85.052	84.237	78.28	7.723
October	85.843	85.237	84.437	79.10	5.492
November	85.783	84.899	83.307	77.82	8.805
December	85.535	85.057	84.507	78.96	0.164
1843.					
January	85.783	86.212	85.759	79.05	1.154
February	86.085	86.809	87.047	80.09	0.033
March	86.643	88.579	89.457	82.36	1.721
April	...	...	89.114	81.58	9.274
May	...	88.224	87.202	80.62	15.989
June	...	85.739	83.549	78.21	16.932
July	86.043	83.879	81.777	77.29	10.899

The Thermometers are corrected for index error.

With a view to deduce more carefully the results of this curious, and hitherto unique series of observations, I have had the observations for the year projected in the form of curves, on the same scale as those formerly submitted to the Society, of the earth tempera-

tures at Edinburgh. These curves are now submitted to the Society, and the results may be thus briefly stated.

I. The annual curve of temperature at Trevandrum is a very irregular one, but has only one great well-marked inflexion, giving a maximum temperature in the beginning of April, corresponding exactly to the period of commencement of the rainy season: The temperature of the air goes through its whole range in the course of the following three months ; but there is no decided minimum in the annual curve.

II. The mean annual temperature of the air appears to be under 80°, whilst that of the earth reaches 85°—a remarkable difference.

III. The accidental, as well as the main annual fluctuations of temperature of the atmosphere, are faithfully reproduced in the curve of temperature at a depth of three feet. They are diminished in intensity, and have a slight retardation in point of time, not exceeding ten or twelve days, at the depth of three feet.

IV. *The range at three feet is nearly 2° greater than at the surface.* This is a very remarkable circumstance; and arises apparently from the atmospheric maximum being prematurely checked by the approach of the rainy season.

V. At six and twelve feet, the range is rapidly diminished, and the casual fluctuations almost entirely disappear, leaving maximum in spring well marked. Notwithstanding the deficiency of some of the maximum temperatures, it may be inferred, that the range at six feet is $5\frac{1}{2}°$; at twelve feet, $2\frac{1}{4}°$; the range at three feet being 8°.

VI. The retardation of epoch is also plainly indicated, although, from the deficiencies just mentioned, it cannot be so accurately determined. According to the best guess I can form, the three feet maximum occurs about the 8th April; the six feet maximum about the 20th April; and that at twelve feet about the 11th May; giving a pretty regular rate of progress of the heat downwards, of one foot in three and a-half or four days.

From these facts, it is easy to deduce, generally, that the phenomena of the propagation of that into the ground near the equator, resemble perfectly those in our own latitudes, though modified in extent. Even at a depth of 12 French feet, the annual variation has not nearly vanished, nor would so, even approximately at more than douhle the depth. Mr Caldecott's experiments conclusively establish the error of the doctrine of Boussingault (at least in the

eastern hemisphere), that the annual temperature near the equator remains unchanged at the depth of a foot below the surface in the shade. This mistake is the more important to correct, because M. Poisson has attempted to confirm his own mathematical theories of heat, by applying them to this alleged fact.*

Mr Caldecott's experiments appear, farther, to prove a considerable excess of the temperature of the earth above that of the air at Trevandrum. This result is in opposition to the opinion of Kupffer, which supposes the earth temperature to be less than that of the air at the equator; and of Boussingault, which supposes them the same.

The results of Mr Caldecott are confirmed in both particulars by Lieutenant Newbold, of the Madras Army, in a paper lately read to the Royal Society of London.†

2. Miscellaneous Observations on Blood and Milk. By Dr John Davy.

The author first treats of the state of combination of the alkali in the blood. Enderlin, from his recent analysis of the ashes of the blood, has inferred that its alkaline reaction is not owing to the presence of carbonate, but of the tribasic phosphate of soda. The author, even admitting the accuracy of Enderlin's results, questions the propriety of applying them to the condition of the alkali in the liquid blood. Carbonate of soda, he observes, is decomposed when heated with phosphate of lime; added in small quantity to blood, it is not to be detected in its ashes. This may account for its not having been found in its ashes. Were the opinion referred to correct, an acid added to blood or its serum, after the action of the air-pump, ought not, on re-exhaustion, to occasion a farther disengagement of air; but he finds that it does. This, with other results, induces him to give the preference to the conclusion, that blood contains the sesquicarbonate of soda.

He next considers the viscid quality of the blood particles, and their tendency in consequence to adhere together in groups distinct from their aggregation in piles, and to adhere as well to other objects. Under the microscope, using the compressor, the quality in question is still exhibited; when a cluster of blood corpuscles is broken up, and its parts set in motion, some of them, while adhering to each

* Theorie de la Chalced. p. 508. † Phil. Mag. No. 5, xxiv. 461.

other, and only then, are drawn out almost to a fibre; and yet the instant the adhesion is broken, the detached particles, now solitary, recover their circular outline. This viscid property of the blood corpuscles appears to be distinct from that of coagulable lymph ; lymph being viscid, not in its liquid state, when it attenuates even the serum, but in its transition state, just before and when in the act of coagulating.

The third subject treated of, is the tendency of fibrin in coagulating to a certain arrangement of its particles. In proof of this, he adduces the instance of the investing pellicle or membrane of the buffy-coat; the tubes of the fibrin formed as a cast, when blood is stirred with a rod in the act of coagulating. The cyst-like cavities occasionally met with in fibrinous concretions, whether filled with the serum or puruloid fluid, found after death in the heart and great vessels ;—in all which a kind of *nisus formativus* is displayed, and an arrangement more or less regular ; and which may be applicable, he believes, to account for the cysts of aneurisms speedily following punctured wounds of arteries, and for the sacs of false aneurisms, continuous with, and hardly to be distinguished from, the lining membrane of the vessel.

The last subject treated of, is the effect of serum in promoting the coagulation of milk—a property which serum possesses in common with the white and yolk of the egg, on the application of heat. The results of trials of mixtures of serum and milk in different proportions are stated, from which it appears, that 1 part of the former heated with 5 of the latter, will occasion its coagulation, and even when mixed with a third more. From analogy, the author infers, that serum and white of egg may have a like effect on vegetable juices containing albuminous matter similar to casein. The action of one animal fluid, and those so like as serum and milk, he refers to as a curious subject for speculation, and as deserving of attention, not only in relation to culinary and some manufacturing processes ; but also, it may be, in connexion with physiology, and perhaps pathology.

3. The Secretary then gave an account of some of Mr Bain's applications of Electricity, as a moving power to Clocks.

The following Donations were presented.

Scheikundige Onderzoekingen, gedaan in het Laboratorium der Uttreschtshe Hoogeschool. 2de Deel 6de Stuk.—*By the Editors.*

The Journal of the Royal Geographical Society of London. Vol. XIII. Part 2. and Vol. XIV. Part 2.—*By the Society.*

The London University Calendar 1845.—*By the Council of the University.*

Account of the Northumberland Equatorial Dome attached to the Cambridge Observatory.—*By the Duke of Northumberland.*

Observations made at the Magnetical and Meteorological Observatory at Toronto in Canada, printed by order of Her Majesty's Government under the superintendence of Lieut.-Col. Edward Sabine, of the Royal Artillery.—*By the British Government.*

Memoir of Thomas Henderson, Esq., Professor of Practical Astronomy in the University of Edinburgh. By Thomas Galloway, Esq.—*By the Author.*

The Grasses of Britain. Part 2. By Richard Parnell, M.D., F.R.S.E.—*By the Author.*

On the Chemical Constitution of the Bones of the Vertebrated Animals. By James Stark, M.D., F.R.S.E.—*By the Author.*

Memoirs and Proceedings of the Chemical Society. Part 12.—*By the Society.*

The Fifth and Ninth Letters on Glaciers. By Professor Forbes, F.R.S.S.L. & E.—*By the Author.*

On the Medicinal properties of Bebeerine. By Douglas Maclagan, M.D., F.R.S.E.—*By the Author.*

Remarks on the Improvements of Tidal Rivers. By David Stevenson, M.D., F.R.S.E.—*By the Author.*

On a possible explanation of the Adaptation of the Eye to distinct vision at different distances. By Professor Forbes, F.R.S.S.L. & E.—*By the Author.*

Monday 21st April 1845.

Sir G. S. MACKENZIE, Bart., V.P., in the Chair.

The following communications were read :—

1. On Dr Wollaston's Argument from the limitation of the Earth's Atmosphere as to the Finite Divisibility of Matter. By Dr George Wilson.

The author commenced by stating at some length, the nature of Wollaston's argument, the object of which was to affirm that the limitation of the earth's atmosphere justified the conclusion, that the air consists of indivisible particles or true atoms. He then discussed the opinions which have been offered by Daubeny, Dumas, Whewell, and others, as to the validity of Wollaston's conclusion, and stated that the special object of his communication was to shew that the inference from the existence of a limit to the atmosphere, that matter is only finitely divisible, is quite unwarranted.

Wollaston, he observed, had only succeeded at the utmost in establishing, that the atmosphere consists of a finite number of mutually repelling molecules, without supplying, or even offering any proof, that these molecules were true atoms. The author urged that the repelling molecules of the carbonic acid and water in the atmosphere, are certainly not atoms, but groups of several particles; and that, for anything we can prove to the contrary, the molecules of oxygen may be equally or even more complex; and farther, that even if it could be shewn that oxygen and nitrogen are chemically homogeneous, it would not entitle us to assume that their repelling molecules were single atoms instead of groups of several, since we have no means of estimating what the complexity of a gaseous molecule may be. The author concluded by stating, that Wollaston's argument left the question of the finite or infinite divisibility of matter exactly where it found it.

2. Biographical Notice of the late Professor Henderson. By Professor Kelland.

In undertaking the task which has been assigned me, of laying before the Society a brief history of the life and labours of one of their most valuable members, I am influenced as much by my regard for the deceased, as by my duty to the Society. I feel that, in a place where I am a comparative stranger, I have lost a friend —a loss the greatness of which can only be appreciated by those who have experienced, as I have done, the integrity of his character, and the warmth of his heart. Mr Henderson was a man whose every action was the dictate of a right conscience. With society, his intercourse was marked by an utter want of selfishness—a rare characteristic; with his friends, it was stamped with true and unostentatious kind-heartedness. He was ready and happy, at all times, to lend them aid, or afford them sympathy in every difficulty,

scientific or social. That his eulogy has fallen to the lot of one so little qualified to do it justice, I sincerely regret; but I lament it the less when I reflect, that in other quarters it has found the able advocacy of my friend Mr Galloway, and that both he and myself have had the invaluable assistance of Mr William Ivory.

Thomas Henderson, Professor of Practical Astronomy in our University, and Astronomer-Royal for Scotland, was born in Dundee on the 28th of December 1798. His father died early in life, leaving five children, of whom he was the youngest, to the care of his widow. His eldest brother having been bred to the law, and seeing prospects of success before him, destined his brother Thomas for the same profession. Accordingly, having received an excellent preliminary education at the grammar school of Dundee, he was sent, at the age of thirteen, to the academy of that town, where he remained two years under the able tuition of the present Professor Duncan of St Andrews. Here he acquired the rudiments of mathematics and natural philosophy, in which he made such progress as to merit being styled by the Professor one of the best scholars he ever had under his care. Even at this time his predilection for astronomy had developed itself; but it cannot be supposed that his acquirements sufficed to enable him to do more than manifest a partiality towards that science. In 1813 he was placed with Mr Small, writer, afterwards town-clerk of Dundee. He now bestowed considerable attention to the decyphering of the manuscripts, and particularly the ancient records of the burgh. He also laboured hard in the acquirement of an accurate knowledge of history and chronology, for which his remarkably retentive memory well qualified him. At the age of twenty-one he repaired to Edinburgh, to pursue his legal studies, and entered the office of Messrs J. and W. Murray, W.S. While in their employment, an application was made to him to undertake the arrangement and classification of the Records of the Burgh of Dundee—a work for which he was amply qualified, and which he satisfactorily performed. His abilities and business habits recommended him to the good offices of Mr Gibson-Craig, who became his patron, and ever remained his steady friend. At his recommendation, he acted as clerk to the late Lord Eldin, both prior and subsequent to his elevation to the Bench. After his Lordship's resignation, Mr Henderson accepted the office of secretary to the Earl of Lauderdale, in which capacity he visited London, where he made the acquaintance of the principal astronomers of the metropolis, from whom he received great kindness. In particular, Sir James

South gave him access to his observatory, and thus enabled him to familiarize himself with the use of instruments.

But it is to Professor Wallace, ever his steady friend, under whose care the Observatory of the Edinburgh Astronomical Institution was then placed, that he owed his rapid progress in astronomy, if not his ultimate adherence to the science. Finding in Mr Henderson a zeal for the study, and an ambition to distinguish himself in it, Mr Wallace, with his accustomed disinterestedness, unhesitatingly placed the Observatory at his command, and thus afforded him the means of acquiring that practical skill for which he was celebrated. To this circumstance I attribute much of Mr Henderson's success in astronomy. However true it be, that talent will develope itself in spite of obstacles, it is no less certain, that, in sciences like this, which owe so much to the external aid of expensive instruments, the fortuitous circumstance of an access to the requisite machinery, is a strong stimulus to exertion, without which few would undergo the drudgery of acquiring a mastery of the practical details of the science. With an observatory at his disposal, Mr Henderson saw the road to eminence in practical astronomy open before him, and he hesitated not to labour zealously to fit himself for the walk to which his inclinations prompted him.

As might be supposed, he had not long entered on a systematic course of reading, ere improvements suggested themselves to his acute mind. The first which he made public, relates to the computation of an observed occultation of a fixed star by the moon. This he transmitted to Dr Thomas Young, then secretary to the Board of Longitude in 1824. It was published by him in the *Nautical Almanac* for 1827 and the four following years; and Mr Henderson received the thanks of the Board for his communication. This paper, and many others of his, were likewise inserted in the *Quarterly Journal of Science*. It is probable that the subject which actually brought Mr Henderson into notice with astronomers, was his detection of an error in the *data* furnished to Mr Herschel for the determination of the difference of longitude of London and Paris. His paper on this subject was published in the *Philosophical Transactions* for 1827, and the Royal Society voted him a copy of the Greenwich Observations, in return for his labour. This communication had also the effect of procuring for him the friendship of Mr Herschel, whose estimate of its importance is expressed in a testimonial which he gave Mr Henderson in 1829, when candidate for the chair of Practical Astronomy, in the following

terms :—" I . . . assure you . . . how highly I appreciate your astronomical acquirements, especially your habits of accurate and scrutinizing calculation. I have, on a former occasion, experienced the value of this investigating spirit and laborious industry, in your detection and correction of an error overlooked by myself in the statement sent me from the Royal Observatory, relative to the operations for determining the difference of longitude of Greenwich and Paris in 1825—a correction which had the effect of raising a result, liable to much doubt from the discordance of the individual day's observations, to the rank of a standard scientific *datum ;* and thus conferring on a national operation all the importance it ought to possess."

Thus flattering was Mr Henderson's first connection with the Royal Society ; nor was his reception by the Astronomical Society less so. In 1828, he prepared an ephemeris for 1829, of the occultations of *Aldebaran* by the moon, for ten different observatories in Europe. In return for this and other valuable communications, the Society presented him with a copy of their Transactions, handsomely bound.

Mr Henderson's reputation as an astronomer was now fully established, and it was his own wish and the desire of his friends, that he should be placed in a situation more congenial to his favourite pursuit. Two such situations presently opened; to neither of which, however, was he immediately appointed. The Town-Council of the city of Edinburgh had granted to Mr Short, in 1776, a lease of a portion of ground on the Calton Hill, on the condition that an Observatory should be erected on it ; but it was not until about forty years afterwards that any instruments adapted to astronomical purposes were placed there, and even then the want of funds prevented it taking its place as an operative establishment. Some years prior to the time of which we speak, a number of gentlemen formed themselves into a society, under the designation of the Edinburgh Astronomical Institution, and by their exertions procured the erection of the present building. Having exhausted their funds, they applied to Government for a grant, which they succeeding in obtaining. From the want of endowment, however, the business of the observatory was somewhat irregularly conducted. In 1828, Dr Robert Blair, Professor of Practical Astronomy in the University of Edinburgh, died. The office had hitherto been a sinecure, and it occurred to many interested in the science, that it might be made useful by the appointment of a person qualified to perform the duties of a practical observer ; and that,

consequently, this vacancy was a favourable opportunity for uniting the professorship with the observatory. As might have been expected, great exertions were made to place Mr Henderson in the situation, but, for the present, ineffectually, from the circumstance that the Government had resolved to postpone any appointment, until it had been maturely considered on what footing the professorship could be placed, with the greatest prospect of success to the science of astronomy. Another opening occurred within a few months of this, occasioned by the death of Dr T. Young. Shortly before his decease, he delivered to Professor Rigaud of Oxford, a memorandum, recommending Mr Henderson as his successor in the superintendence of the Nautical Almanac. The appointment did not take place, but there exists perhaps no higher testimony to Mr Henderson's merit than this recommendation, when it is remembered that it arose out of his scientific reputation, altogether unaffected by private friendship, and that Dr Young ranks among the very highest of the philosophers of the present century.

Although disappointed in the instances we have mentioned, a situation shortly fell in Mr Henderson's way, which appeared likely to establish him in a suitable manner. On the death of Mr Fallows, the astronomer at the Cape of Good Hope, his qualifications were so well known to the parties with whom the appointment lay, that the office was offered to him without any solicitation on his part, or application on that of his friends. Mr Henderson accepted the appointment, and sailed for the Cape in January 1832. Immediately on his arrival there, he entered on his duties with ardour; and so indefatigable were his exertions that he amassed a most valuable series of observations, and found time, besides, to prepare and transmit to the Royal and Astronomical Societies, various papers connected with the science. The principal results of his labours at the Cape were, the determination of the latitude and longitude of his station—of the positions of stars near the South Pole, for fixing the polar positions of his instruments—of the amount of refraction near the horizon—and of the moon's horizontal parallax; together with observations on the planet *Mars*, for the purpose of computing his parallax, and that of the sun—of Encke's and Biela's comets—of occultations of fixed stars by the moon—of a transit of *Mercury*—and of between 5000 and 6000 declinations. Prior to his appointment to the Cape Observatory, Mr Henderson had had slight symptoms of a disease of the heart, and he soon found that the labours and anxieties incident to his position, together with the serious disadvan-

tages attendant on the building in which he was compelled to reside, rendered it impossible that he should retain the situation. Accordingly, in a letter, dated May 27. 1833, he tendered his resignation to the Lords of the Admiralty, adding that, on his return to England, he would immediately proceed to the task of calculating and reducing the various observations he had made, and of extracting from them those useful results they were intended to afford.

Amongst the other annoyances to which Mr Henderson was subject at the Cape, may be mentioned that, which had been the source of much vexation to his predecessor, the state of the mural circle. Mr Fallows had found remarkable anomalies amongst the readings of the several microscopes, in different positions of the instrument, during a revolution upon its axis; whence he had been led to infer that it had suffered a change of figure since leaving the maker's hands. Mr Henderson's first employment was the rigid investigation of these anomalies, the results of which are printed in the eighth volume of the *Memoirs of the Astronomical Society*, p. 141. He came to the conclusion, that the anomalies proceeded partly from an oval form which the instrument had acquired, and partly from variations in the position of the centre of the instrument while revolving, relative to the microscopes, owing probably to the pivots not being exactly circular; whilst, in addition, the whole instrument frequently changed its position upon the pier, from the Y support of the front pivot not being perfectly steady. He agreed, moreover, with Mr Fallows in concluding, that the mean of the readings of six microscopes is little, if at all, affected by these causes; so that, on the whole, it appeared that the degree of accuracy to be obtained from the instrument was not inferior to that given by the best instruments of similar construction hitherto made. The conclusion of the matter is this:—on the circle being brought to this country and examined by Mr Simms, it was found that the large steel collar carried by the conical axis was quite loose;—"a child's hand could turn it."

On Mr Henderson's return to Edinburgh he set about reducing his own observations; a task voluntarily imposed on himself, and one which he sacrificed his own interests to fulfil. No long period elapsed, however, before a situation opened, in every way suited to his taste. An agreement was entered into between the Commissioners of the Treasury and the members of the Astronomical Institution of this place, whereby the latter gave their observatory and instruments to the use of the Professor of Practical Astronomy in the University,

and the former agreed to supply a salary to the Professor. Mr Henderson was selected as the proper person to occupy this situation; and he entered on the duties of the office in October 1834. The value of the observations which he made during the ten years he held this appointment is too well known to need comment. But Mr Henderson did not confine himself to the routine of Observatory duties, important as they are. No sooner had he got the Institution into working order, than he again vigorously attacked his Cape observations, and laid the results before the world. He commenced by communicating to the Astronomical Society a valuable catalogue of the mean declinations of 172 principal fixed stars for January 1. 1837. This was followed by a memoir on the refraction of stars near the horizon, in which he concludes, that no difference of refraction north and south of the zenith appears as far as to 88° of zenith distance. Another very important communication of Mr Henderson's was the determination of the equatorial horizontal parallax of the moon. This is best effected by the comparison of results north and south of the equator. It is well known, that to obtain it by this method, was one of the chief objects of La Caille's voyage to the Cape in the middle of the last century. Ever alive to the interests of the science, Mr Henderson determined to avail himself of his own position when at the Cape, to repeat the observations. The result to which he arrives is extremely satisfactory, differing as it does but slightly from La Caille's.

These and similar labours place Mr Henderson high in the estimation of astronomers. But something more is requisite to give a man interest in the eyes of the world at large. In the field of science, many a patient cultivator who has conferred a real boon on mankind has been altogether forgotten. The successful opening of some unexplored district, or the discovery of some popularly interesting fact, confers, and properly confers, a wide-spread fame. The development of scientific knowledge, as of every thing relating to the preparation of the races of mankind for their future destinies, is regulated by an All-wise hand, which, whilst it dispenses sufficient to satisfy each generation as it passes, kindly holds back an inexhaustible store to supply the intellectual cravings of races yet to follow. The natural sciences have not yet (as a philosopher unwisely asserted a century ago they had) nearly attained their ultimate perfection; and doubtless are not destined soon to do so. Hence, whoever is privileged to make a discovery, however trifling, is worthy of respect, as having contributed towards the fulfilment of

vast designs, slowly but steadily progressing towards their accomplishment. Should the investigation of the parallax of *α Centauri*, which Mr Henderson gave to the world, turn out correct, of which there is, at present, little doubt, then shall we claim for him the distinction which I have marked with honour—the distinction of having extended astronomical measures beyond the limits of our system.* Nor will it diminish his fame that a similar determination was attempted before, or that an equally successful one was nearly contemporaneous with his own. In few cases has an individual made a successful essay, without having been preceded by others, not destined to reach the goal, or accompanied by some one, to share the honour. There is reason to fear, that, in the present instance, whatever honour is due will fall to the lot of another. It is to be regretted, that (whether the conclusion shall ultimately be verified or not) no scientific award was made him, in consideration for the skill displayed; whilst his contemporary received for his labours a medal from this country. Let us hope that his reward will be the association of his name with the discovery.

There is another point wherein, as Mr Henderson's advocate, I

* On this subject I beg to refer to my friend Mr Main's admirable memoir in the *Transactions of the Astronomical Society*, v. . It may be interesting to add the following remarks from a private communication of his to myself:—"At the time when I was requested to draw up a memoir on the subject of annual parallax, the amount of evidence of its sensible existence for any star whatever, which had even arisen from the discussion of investigations previous to Bessel's, was exceedingly small; and I believe that, at that time, any new attempt was likely to be received with the smile of incredulity, which repeated failures will always, in the long-run, tend to produce. No sensation was caused in England by the announcement of Bessel's investigation; and I remember that, to some astronomers, his confidence in the certainty of his result seemed far from warranted. At present there exists very little scepticism with respect to our knowledge of the parallax of 61 Cygni. But it was deduced by a method with which English astronomers were, I may assert, in general, unfamiliar, perhaps through the want of a good heliometer. . . . . . It was an evidence of very creditable faith, therefore, which induced Mr Henderson, in default of other means, to attack this star rigorously by meridian observations in both elements, and this notwithstanding his accurate knowledge (for no man living excelled him in his knowledge of every thing that had been done in every department of modern practical astronomy, from its commencement) of that total failure of every attempt that had been made under the ablest astronomers of this country, in the northern hemisphere. And so fully was he impressed with the conviction of his ultimate success, that he left it as a legacy to his successor, who has sent over a very complete and beautiful series of observations, which, after their discussion by Mr Henderson himself, not long before his decease, has, in the minds of many, pretty nearly decided affirmatively the question of the existence of a considerable parallax."

would assert his claims to reward. During a long series of years, he devoted much of his leisure time to the reduction of the Cape Observations, which having been made in a public observatory, it was the duty of the public to present in a proper shape to the world. Mr Henderson performed this duty with no other remuneration than the satisfaction derived from giving a perfect form to his own results. We lament, however, that his infant daughter will reap none of the fruits of that excessive midnight toil which hastened her father's progress to the grave, more especially as she is an orphan indeed—deprived of both her parents. To the memory of her mother, who died shortly after her birth, it is fit I should pay a tribute. She was the daughter of Mr Adie, the celebrated optician of this city. In his selection of this lady as his partner, no less than in the other acts of his life, Mr Henderson manifested the soundness of his judgment. She was in every way suitable for him. A member of a talented family especially devoted to scientific pursuits; herself gifted with a mind of great capacity, which a liberal education had cultivated and refined; of an amiable disposition and a cheerful temperament, she was well fitted to sympathise with the depressions of a spirit weighed down with fatigue, or to brighten those passages of life, which, without her aid, would have appeared gloomy. Add to this, that her attainments were considerable; so much so as to render her not only capable of appreciating and admiring her husband's ardour and enthusiasm in his favourite studies, but even of occasionally assisting him in the prosecution of them. Under these circumstances, it need scarcely be said that their union was a happy one. Her death, at a time when their fondest wishes seemed realized in the birth of a daughter, was a shock from which he never recovered. His manner, which had always been deficient in buoyancy, became from that moment solemn. In anticipations of the future, he rarely indulged; in a melancholy retrospect of the past, too often. This, added to his late habits, preyed rapidly on his constitution, and hastened his death. He expired on the 23d of November 1844, of a disease of the heart.

To draw his character—scientific or social—is an easy and a pleasing task. As an observer, he was ingenious and accurate—in testimony of which it is sufficient to say, that his observations carry the entire confidence of every astronomer in Europe. On this head, I cannot do better than allow one of their number (Mr Main) to speak for me. He says, "The praise of being the first discoverer of our distance from a fixed star, even should it be ultimately esta-

blished, though a brilliant addition to his fame, is not precisely that which will cause his name to be remembered with gratitude by every one who understands what ought to be the routine duty prescribed to himself, and practised by the astronomer. His business in general—his every-day work—is not speculative, but practical; not conversant, except, by the way, with the almost despaired-of problems of the science, but with the establishment of the data which belong to his epoch. He is to fix, with indisputable accuracy, the places of the most remarkable of the stars; he is to bring his contribution to the perfecting of the lunar and planetary tables; he is to assist in the measurement of our own planet, as the basis of all our ulterior comparisons; and he must do this by submitting to a routine, whose irksomeness and labour no one can appreciate but himself. Professor Henderson did all this in a way which lays just claim to the gratitude of succeeding astronomers; his speculations on our connection with the sidereal system were but the recreations of a mind that never swerved from the amount of toil imposed by the less dignified, but more useful occupations of the astronomer. His observations, followed up as they have been by Mr Maclear, will be the basis of all the astronomy that is peculiar to the southern hemisphere; and it is to his results, that the astronomers of the next age will look for the facts of their science."

I apprehend, however, that no slight foundation of Mr Henderson's future fame, will be found to rest on the admirable use which he made of his own observations. Having acquired a thorough knowledge of all that had been done, and all that was desirable in astronomy, he was ever on the alert to seize any opening which the circumstances under which these were made, might seem to offer. Witness his memoirs on refraction, and on the parallax of the moon, which were suggested by the position of the observatory in which he was at that time placed. The arguments, too, from which his conclusions were drawn, are marked by singular perspicuity and acuteness. The standard which he adopted in mathematical reasoning, was the works of Euler. Not many days before his death, I found him reading some book of travels, and on expressing my pleasure at finding him so employed, he remarked, "I should very much prefer a volume of Euler, but I cannot get at it." In astronomy he looked upon Bessel as his model, almost as his master. It was my good fortune to participate in his entertainment of that distinguished astronomer, as we had previously united in the reception of Encke. I would fain efface from my memory the pleasure

we experienced on both those occasions. In the case of Bessel, his was the delight of a son who had found a father. He hung on his words and watched his looks with a mingled feeling of affection and pride. That he profited by studying the writings of these great men, his own researches sufficiently testify. His path lay not in the complex analytical investigations of the French school; but what he professed, he was profoundly acquainted with. His natúral modesty appears nowhere to greater advantage than in his sternly disclaiming all pretensions to knowledge with which he was only partially acquainted. In social life he was kind and affectionate; ever ready to assist his friends, without regard to his personal comfort. His naturally reserved manner unfitted him to occupy that position in general society which his extensive information and accurate memory amply qualified him for. He felt, too, what his position, as Her Majesty's Astronomer for Scotland, demanded, and having no facility of adapting himself to the peculiarities of others, he was content to limit his circle to a few chosen friends. Amongst these he never forgot his early patrons, towards whom he manifested to the last the same deep feelings of gratitude. By them, and by all who knew him intimately, he was much beloved, and as much respected. They will agree with me in saying that we have lost a valuable friend,—a man liberal and high-minded,—conscientious to a degree, —ready with heart and hand to assist, when assistance was called for,—with a judgment so sound, and experience so improved, as to render him a safe adviser, and an invaluable coadjutor. May the reputation he has left, and the kind remembrances which his friends cherish of him, stimulate us to follow his example, and imitate his virtues.

3. On the Chemical Relations of Creosote. By William Gregory, M.D., Professor of Chemistry.

The author stated, that, being struck with the singular resemblance between the properties of creosote and those of carbolic acid, as described in all chemical works, he had tried the action of a mixture of chlorate of potash and hydrochloric acid on creosote, and had thus obtained a very large proportion of chloranile, the compound yielded by carbolic acid, when treated in the same way. He had also obtained, by the action of nitric acid on creosote, evidence of the production of nitropicric acid, which is also obtained from carbolic acid.

He drew the conclusion, that if these two compounds be not identical, they are, at least, very closely connected, and in all probability, contain the same radical. It is possible that creosote may be a definite compound of carbolic acid with some allied body. At all events, it is very remarkable, that these two compounds, described as different, should agree in density, taste, smell, antiseptic property, power of combining with bases, power of dissolving resins, indigo, &c., and finally in composition; although probably perfectly pure creosote has not yet been analysed.

The author mentioned these results very briefly, having discovered, just before the meeting, that he had been anticipated in his experiments on creosote, by M. Laurent, who had obtained the same results, and drawn very nearly the same conclusions, in a very recent paper, and who was therefore entitled to priority in the matter.

4. On the Thermometric Correction of Magnetic Instruments. By J. A. Broun, Esq.

Mr Broun points out the defects of the usual methods of ascertaining the corrections for temperature, applicable to magnetic instruments generally, and the vertical force magnetometer in particular. The usual methods depend upon the knowledge of the time of vibration, or upon the statical deflection produced by a neighbouring magnet, under differing circumstances of temperature. Mr Broun shews that both these methods are liable to great objection; and he has succeeded by arranging the ordinary hourly observations of the instruments in groups, in obtaining consistent results for the temperature correction by a process of elimination.

5. On the Constitution of Bebeerine. By Douglas Maclagan, M.D., F.R.S.E., and Thomas G. Tilley, Esq., Birmingham.

Bebeerine is a vegetable alkaloid, discovered by Dr Rodie of Demerara, in the bark of the Bebeeru tree, *Nectandra Rodiei*, Schomburgk. The properties of the alkaloid and its application in the form of sulphate, in the treatment of disease, were formerly described by Dr Maclagan in a paper read before the Society, and published in their Transactions, vol. xv., part 3.

As bebeerine does not crystallize, and is coloured, its purity could only be ascertained by analysis. The authors describe a new method of purification, in which oxide of lead is employed to separate tannin, &c.

The mean results of the analysis performed, were as follows :—

Carbon, ...	71·92
Hydrogen, ...	6·49
Nitrogen, ...	4·75
Oxygen, ...	16·84
	100·00

The mean atomic weight, as deduced from the analysis of the double salt of hydrochlorate of bebeerine, with bichloride of platinum, is 3756·77 (oxygen = 100), and, making this the groundwork of the calculation, the authors were led to the formula $C_{35}\ H_{40}\ N_2\ O_6$ for bebeerine, which gives the atomic weight 3681·38.

It is remarkable that this formula is the same as that generally admitted for morphia, and not, as might be expected from the action of bebeerine, allied to those of quinine and cinchonine. The mode of arrangement of the atoms is, no doubt, different in morphine and in bebeerine, notwithstanding the apparent identity of proportions. In fact, the difference of physical properties proves a difference in the grouping of the atoms.

The authors were not able to obtain sipeerine, the substance which accompanies bebeerine, in sufficient quantity for analysis. It appears to be also an alkaloid.

The following Candidate was duly elected a Fellow of the Society :—

Professor Lewis Gordon of Glasgow.

The following Donations were presented :—

Journal of the Statistical Society of London. Vol. VIII.—Part 1. —*By the Society*.

The Electrical Magazine. Conducted by Mr Charles V. Walker. —Vol. 1. No. 8.—*By the Editor*.